This listing of claims will replace all prior versions and listings of claims in this application:

a.) Listing of Claims

1.   (Currently Amended) A method for automatic determination of optical parameters of a layer stack, comprising the steps of:

- obtaining an acquired <u>curve shaped</u> optical measured spectrum at one location of the layer stack and selecting tabulated acquired spectrum curve shape parameters;

- calculating an analysis spectrum on the basis of specified optical parameter values to obtain a calculated <u>curve shaped</u> analysis spectrum and tabulated calculated spectrum curve shape parameters;

- comparing the acquired spectrum curve shape parameters to the calculated spectrum curve shape parameters;

- selecting a match between the acquired spectrum curve shape parameters and the calculated spectrum curve shape parameters;

- calculating associated analysis spectrum or spectra corresponding to selected optical parameters corresponding to the match; and

- determining values or value ranges for the optical parameters of the layer stack by comparing the calculated associated analysis spectrum or spectra with the acquired optical measured spectrum.

2.   (Previously presented) The method as defined in Claim 1, wherein tabulated acquired spectrum curve shape parameters comprise one or more of the following: local noise of the spectrum; mean of the spectrum; standard deviation of the mean; number and location of the extremes; intensity values or relative distances between them; features of enveloping curves of the minima and maxima; an averaged curve

profile; beats; and a number, location, and values of the extremes present in a Fourier transformation of the acquired optical measured spectrum.

3. (Previously presented) The method as defined in Claim 1, further comprising restricting the value ranges for the optical parameters to be determined by evaluating the acquired optical measured spectrum in accordance with an extremes method and/or a Fourier transform method.

4. (Previously presented) The method as defined in Claim 1, wherein comparing the characteristic acquired spectrum curve shape parameters to the calculated spectrum curve shape parameters is performed by means of coarse and fine fitting methods.

5. (Canceled)

6. (Currently Amended) A method for automatic determination of the composition sequence of a layer stack, comprising the steps of:

- obtaining an acquired <u>curve shaped</u> optical measured spectrum from a location in the layer stack and selecting tabulated acquired spectrum curve shape parameters;

- obtaining one or more spectra of known layer stack composition and determining tabulated corresponding curve shape parameters of the known layer stack;

- comparing the acquired spectrum curve shape parameters to the tabulated corresponding curve shape parameters; and

- identifying one or more possible composition sequences of the layer stack from the comparison step.

7. (Previously presented) The method as defined in Claim 6, further comprising determining value ranges for optical parameters-simultaneously with the identification step.

8. (Previously presented) The method as defined in Claim 7, further comprising calculating an analysis spectrum on the basis of the identified composition sequence of the layer stack and the value ranges for optical parameter values and comparing analysis spectrum curve shape parameters to the tabulated acquired spectrum curve shape parameters.

9. (Previously presented) The method as defined in Claim 6, further comprising inspecting the identified composition sequence of the layer stack, as well the value ranges for optical parameters.

10. (Currently Amended) A computer-readable medium comprising a computer program carrying out the steps:

- obtaining an acquired curve shaped optical measured spectrum at one location of the layer stack and selecting tabulated acquired spectrum curve shape parameters;

- calculating an analysis spectrum on the basis of specified optical parameter values to obtain a curve shaped calculated analysis spectrum and tabulated calculated spectrum curve shape parameters;

- comparing the acquired spectrum curve shape parameters to the calculated spectrum curve shape parameters;

- selecting a match between the acquired spectrum curve shape parameters and the calculated spectrum curve shape parameters;

- calculating associated analysis spectrum or spectra corresponding to selected optical parameters corresponding to the match; and

- determining values or value ranges for the optical parameters of the layer stack by comparing the calculated associated analysis spectrum or spectra with the acquired optical measured spectrum.

when the computer program is executable on a computer or a corresponding computation unit.

11. (Previously presented) A computer-readable medium comprising the computer program as defined in Claim 10, wherein tabulated acquired spectrum curve shape parameters comprise: local noise of the spectrum; mean of the spectrum; standard deviation of the mean; number and location of the extremes; intensity values or relative distances between them; features of enveloping curves of the minima and maxima; an averaged curve profile; beats; and a number, location, and values of the extremes present in a Fourier transformation of the acquired optical measured spectrum.

12. (Previously presented) The computer program as defined in Claim 10, further comprising restricting the value ranges for the optical parameters to be determined by evaluating the acquired optical measured spectrum in accordance with an extremes method and/or a Fourier transform method.

13. (Previously presented) The computer program as defined in Claim 10, wherein comparing the characteristic acquired spectrum curve shape parameters to the calculated spectrum curve shape parameters is performed by means of coarse and fine fitting methods.

14. (Canceled)

15. (Canceled)